



The human brain

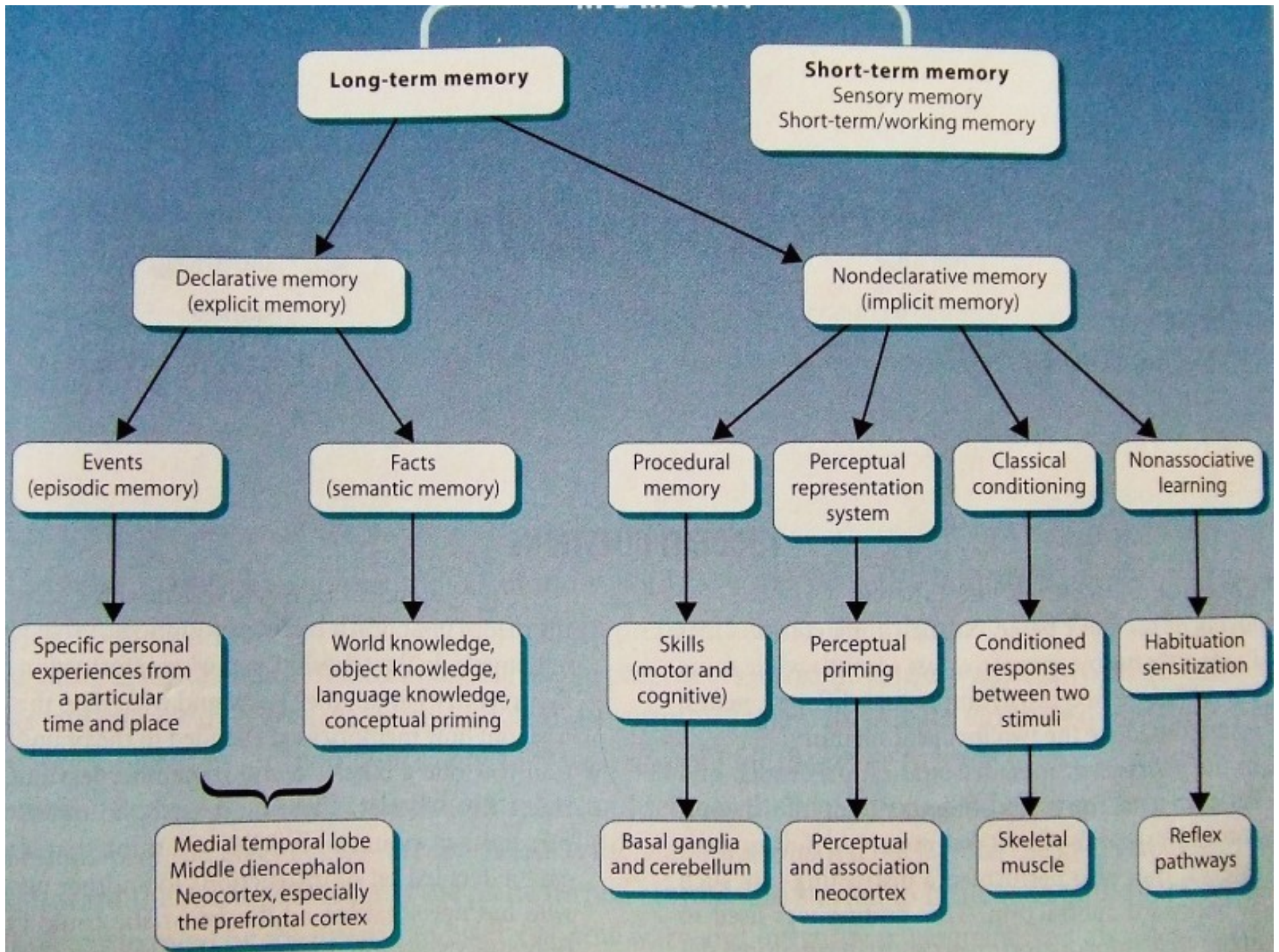
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Marcel Proust: founding father of neuroscience?



Klemens von Metternich

1815

Explicit (declarative)



Implicit (procedural)





Hippocampus



Henry Molaison 1928 - 2006

HM



Chronic stress effects on the hippocampus: the realm of memory

Impaired synaptic plasticity

Atrophy of dendritic networks of communication

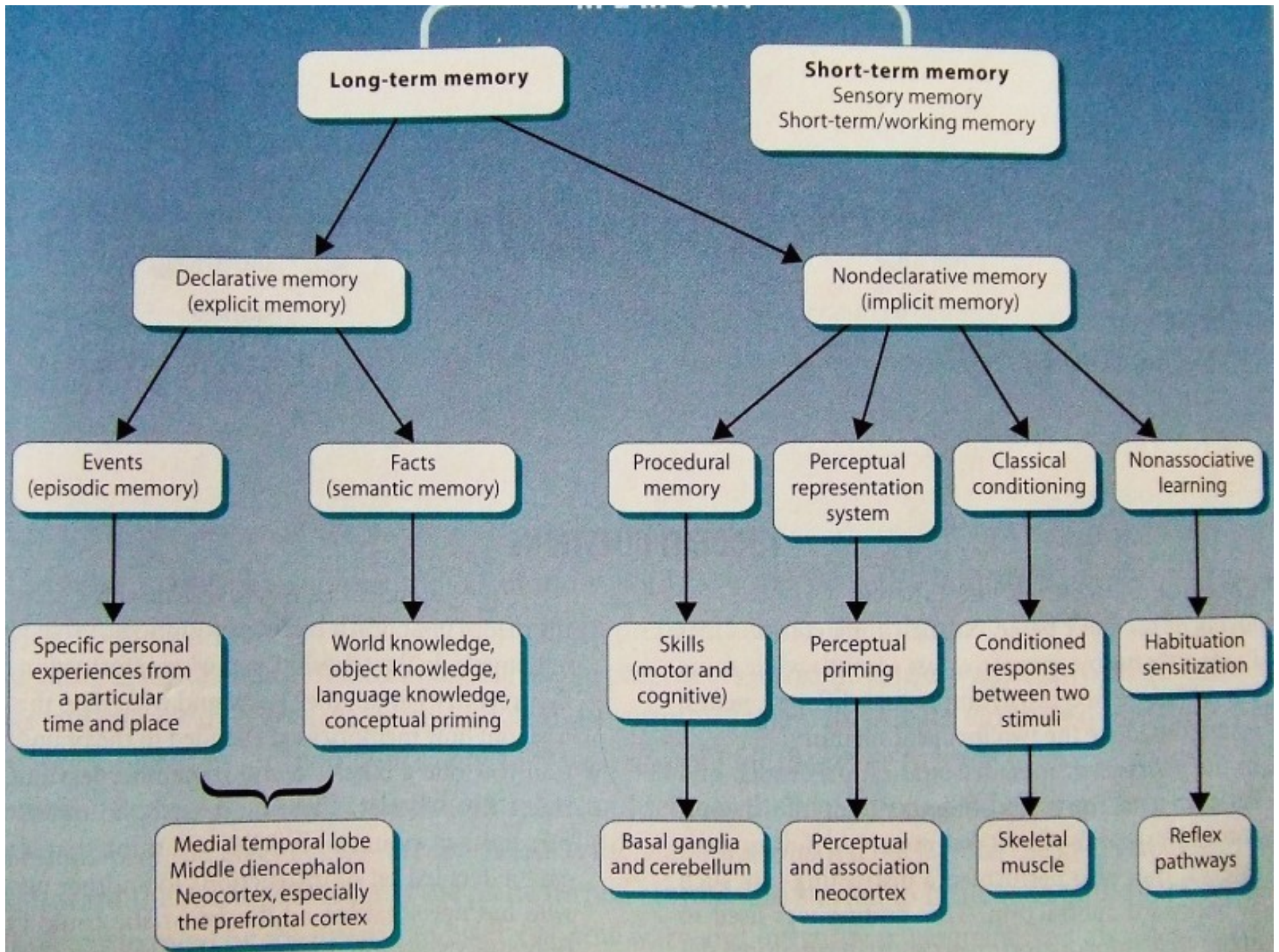
Fewer new neurons

Dead neurons!

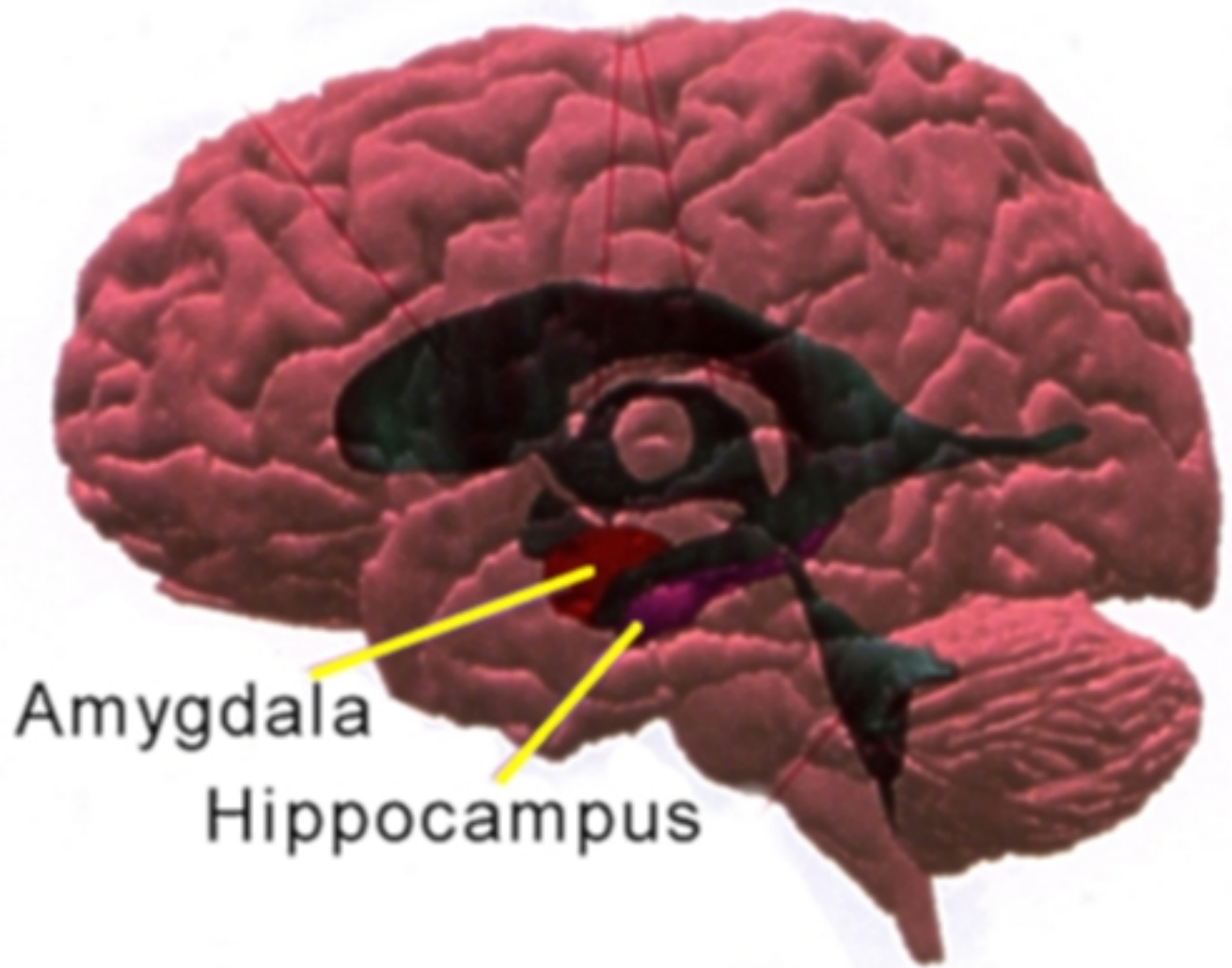
Decreased overall hippocampal volume

Result:

Impaired formation and retrieval of
long-term memories







Amygdala

Hippocampus

The effects of chronic stress in the amygdala: the realm of fear and anxiety

More excitable neurons

More connections among neurons

Result:

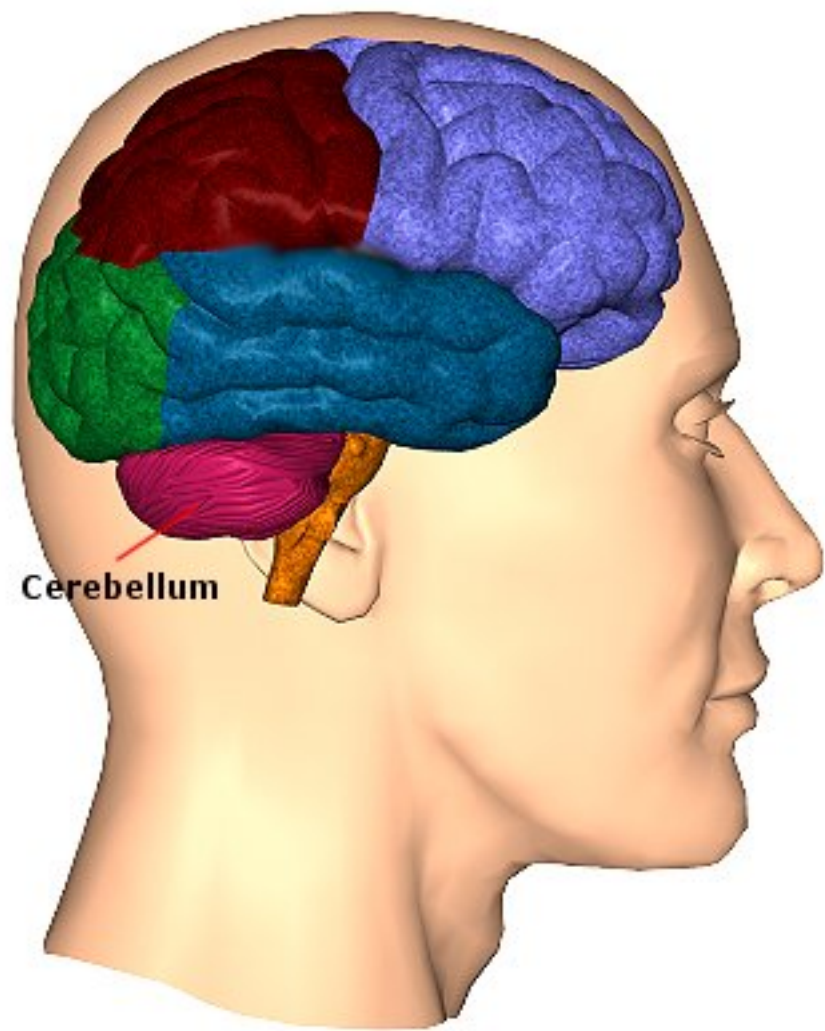
**More anxiety, faster fear-
conditioning, slower habituation**

Combining hippocampal
and amygdaloid effects of
chronic stress:

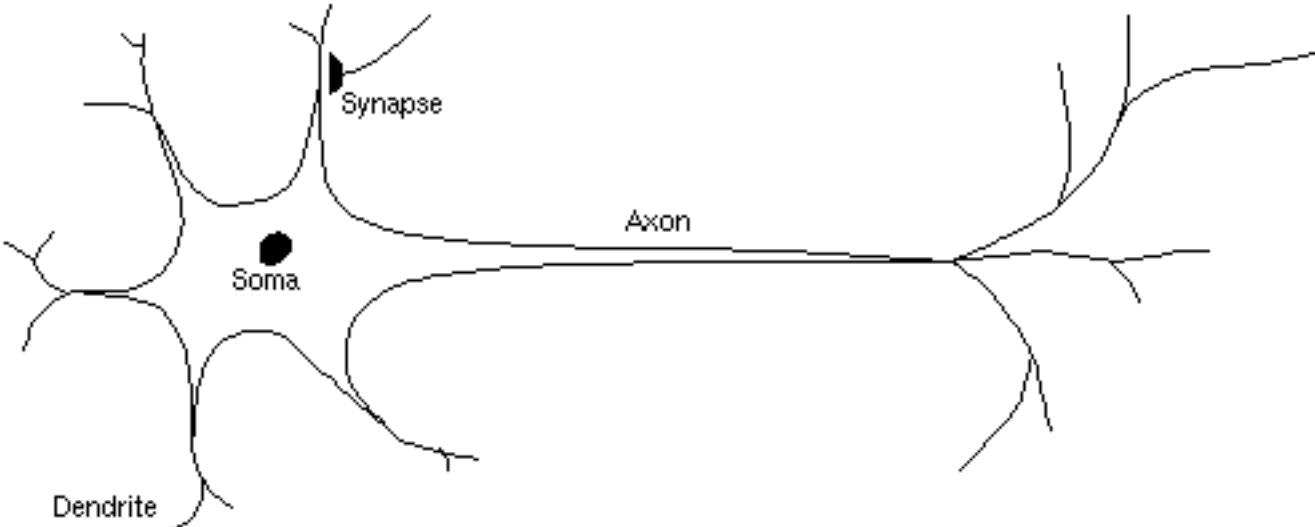
**Weakened conscious memories;
Exaggerated autonomic memories.**

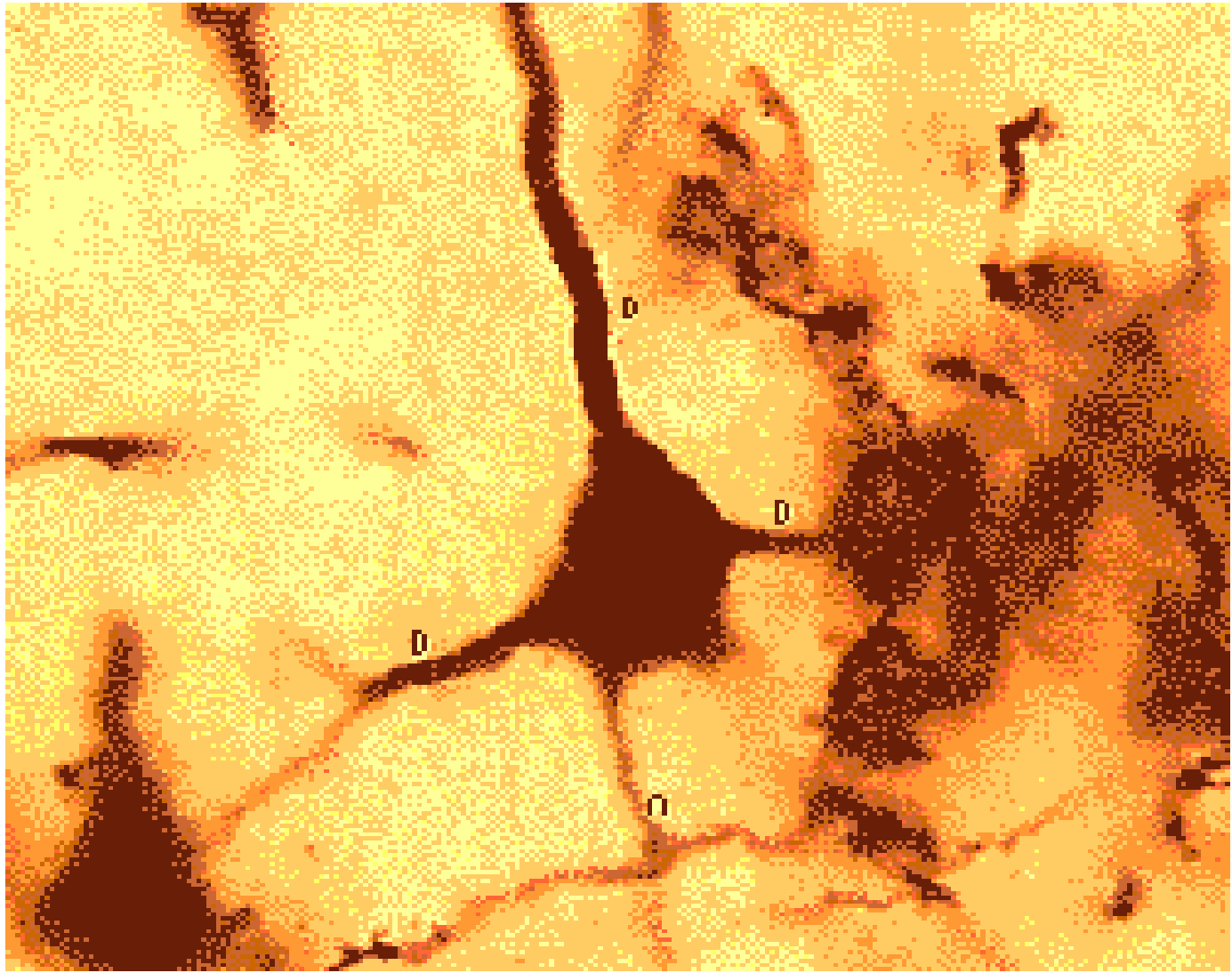
Implicit (procedural)

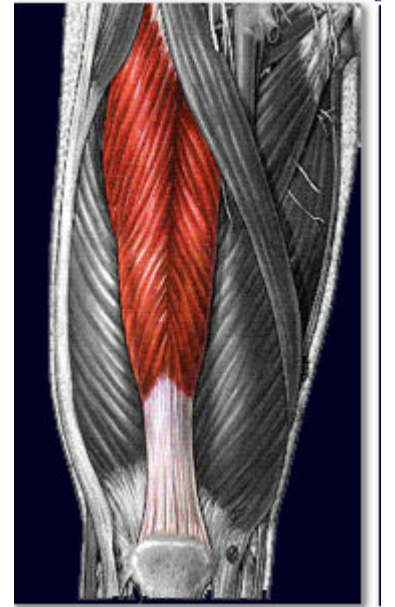
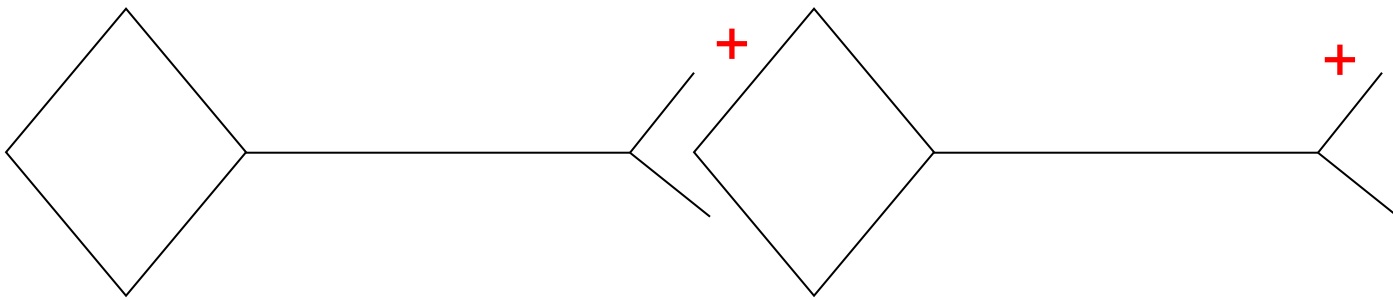


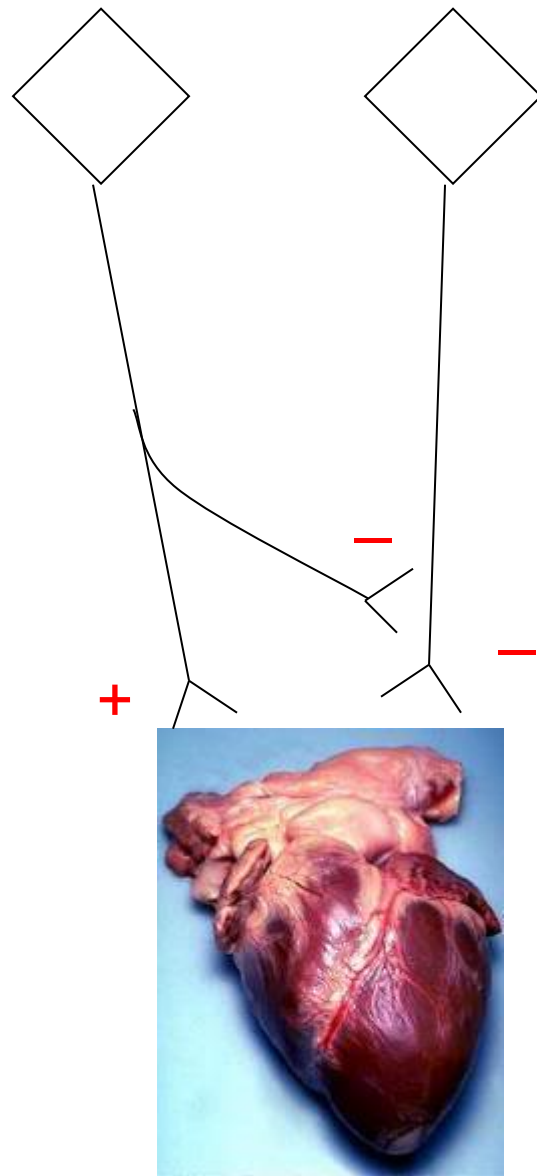
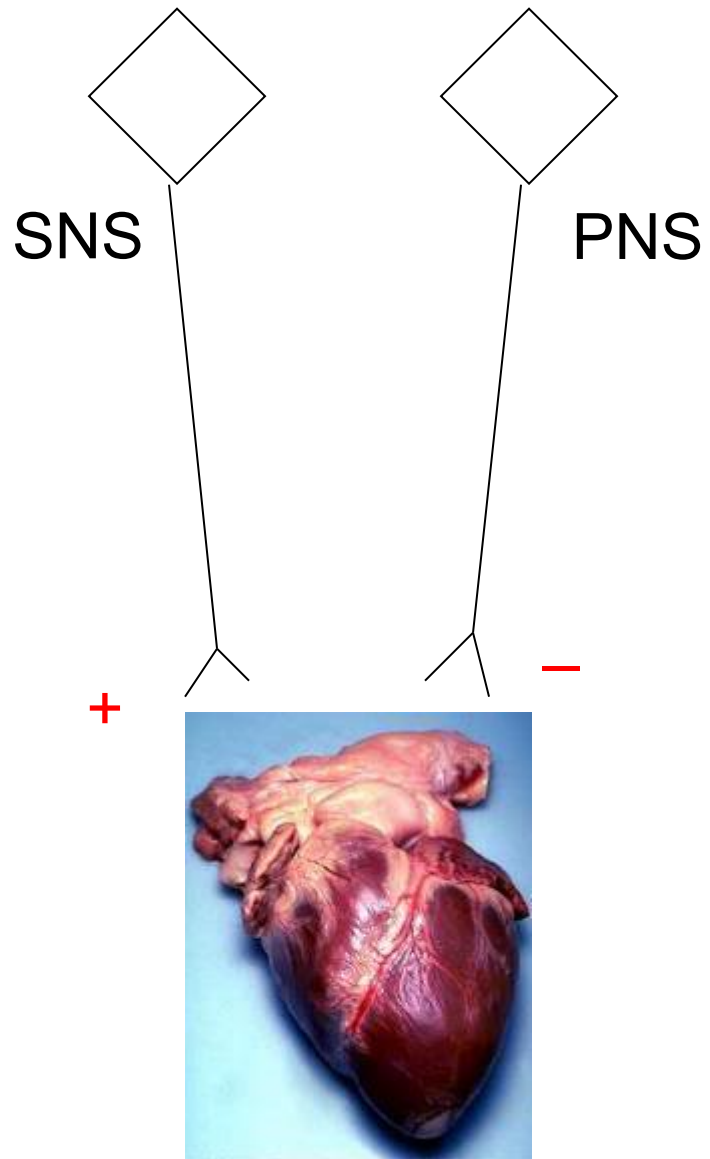


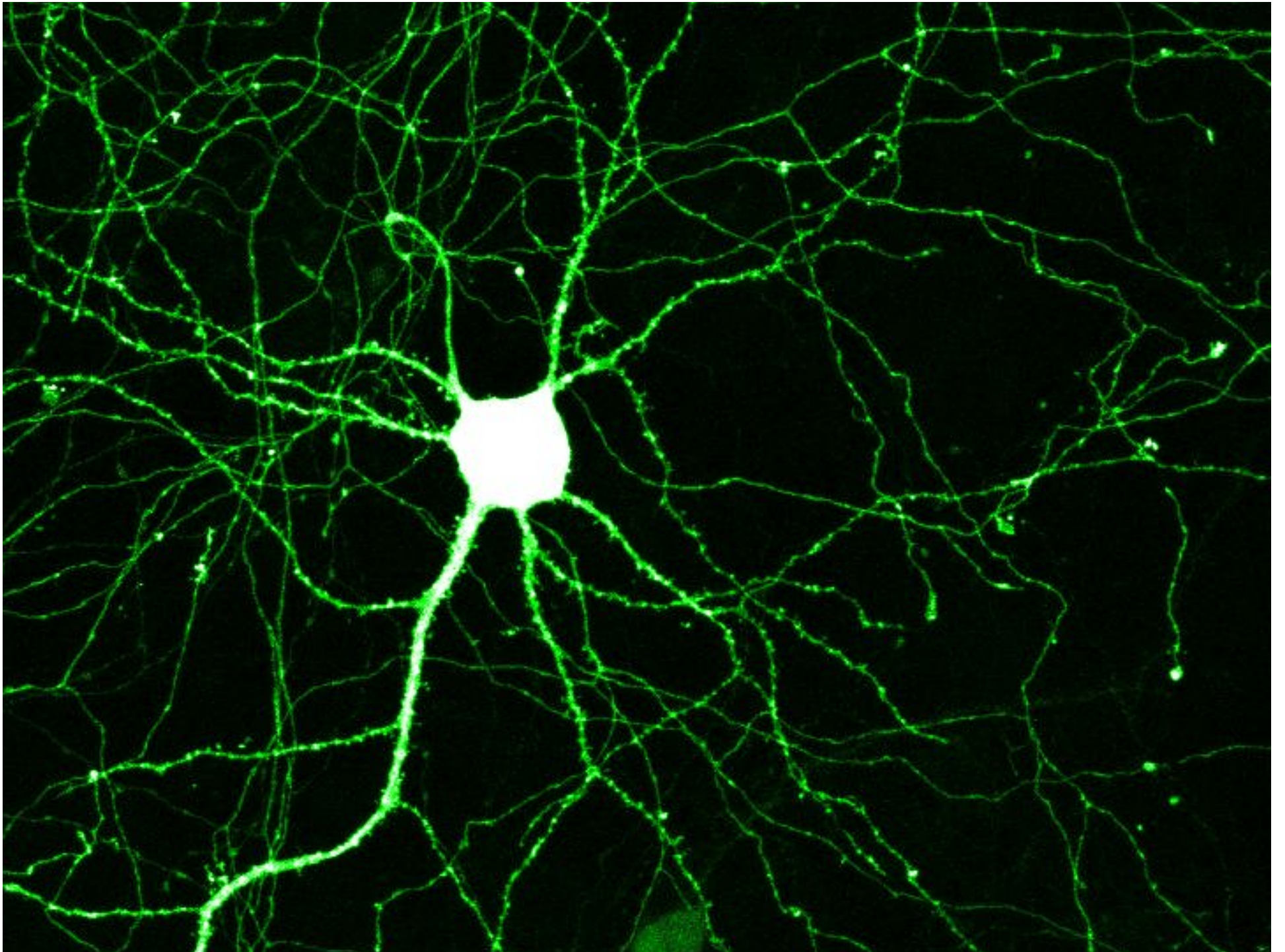
Cerebellum



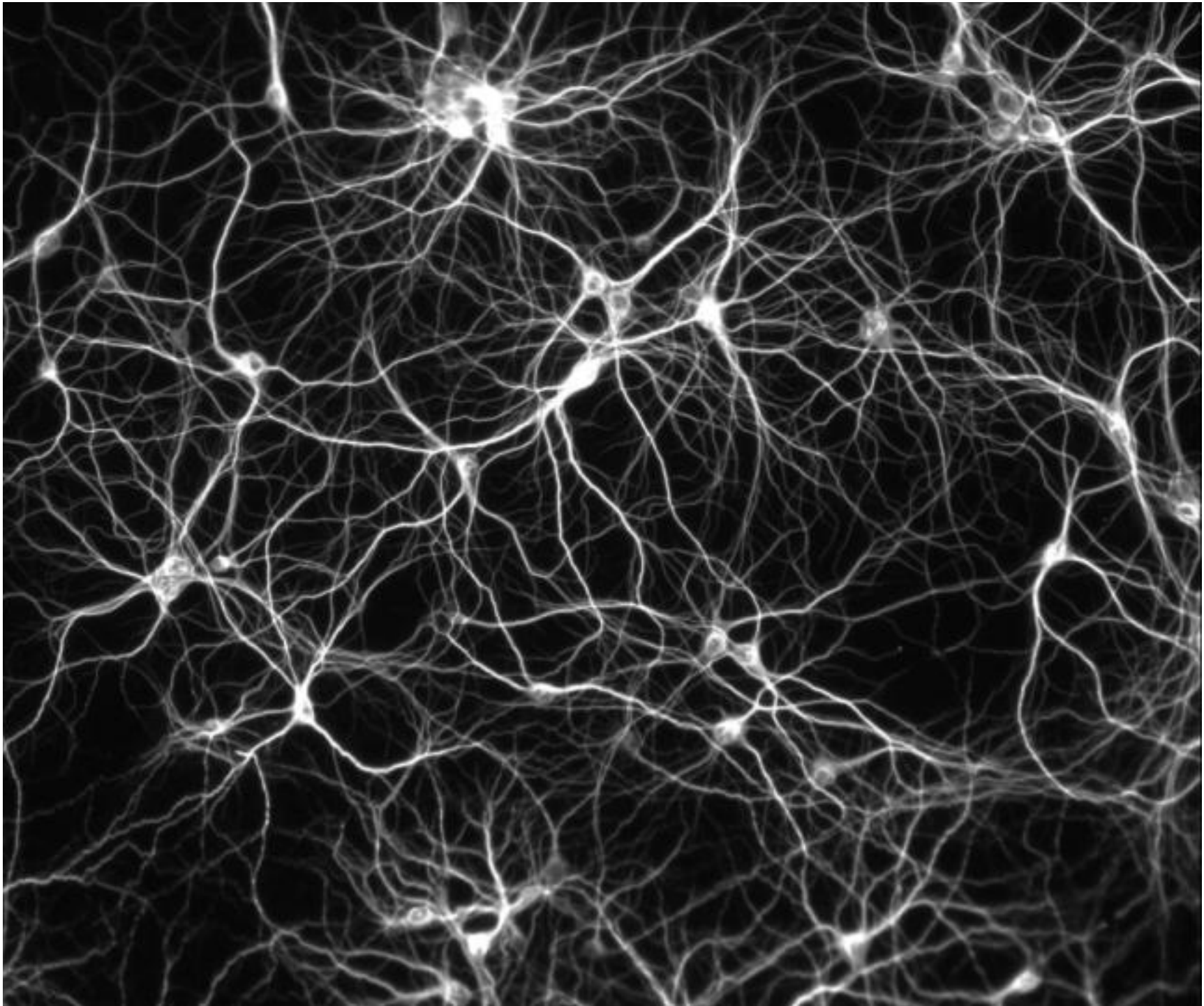


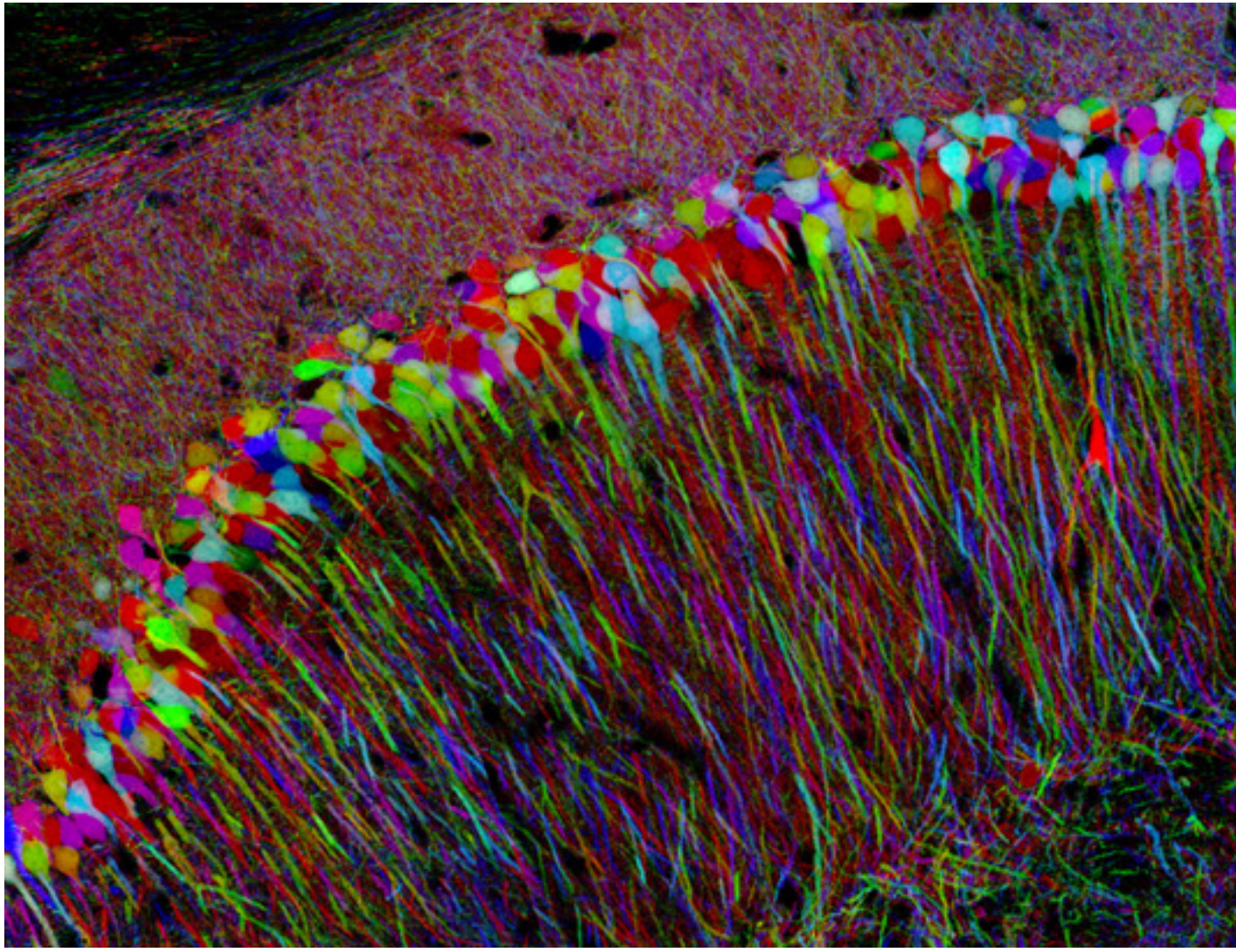


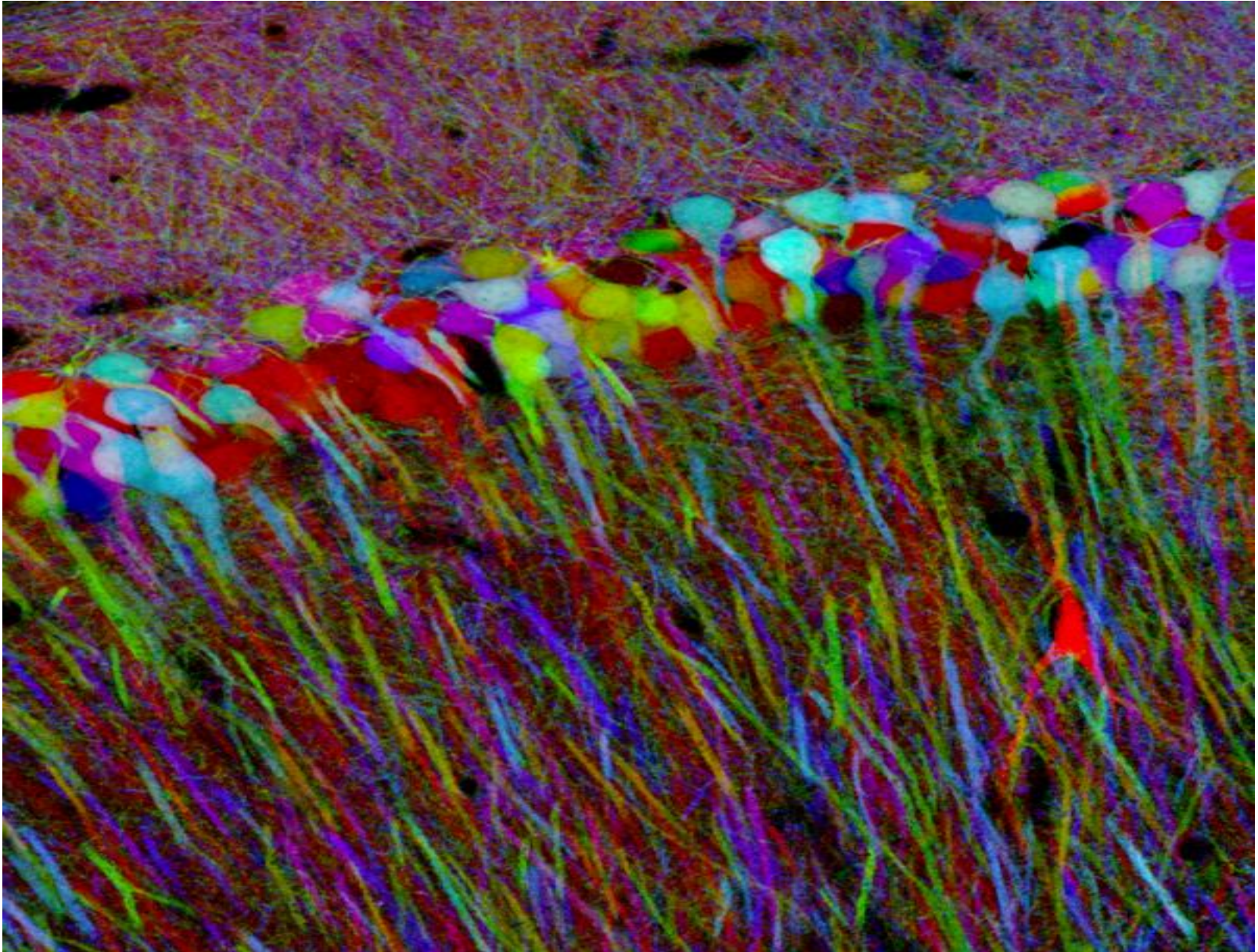




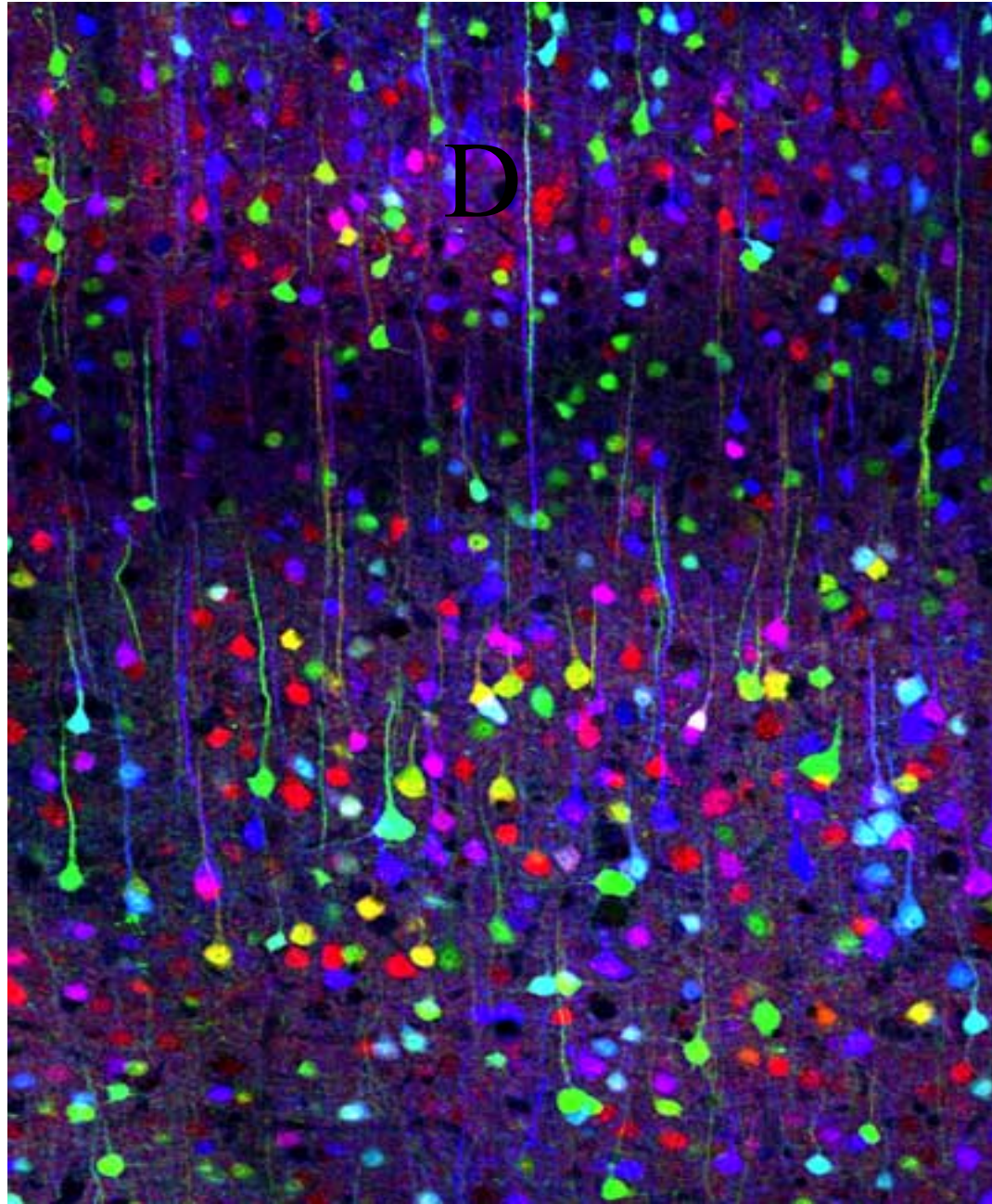


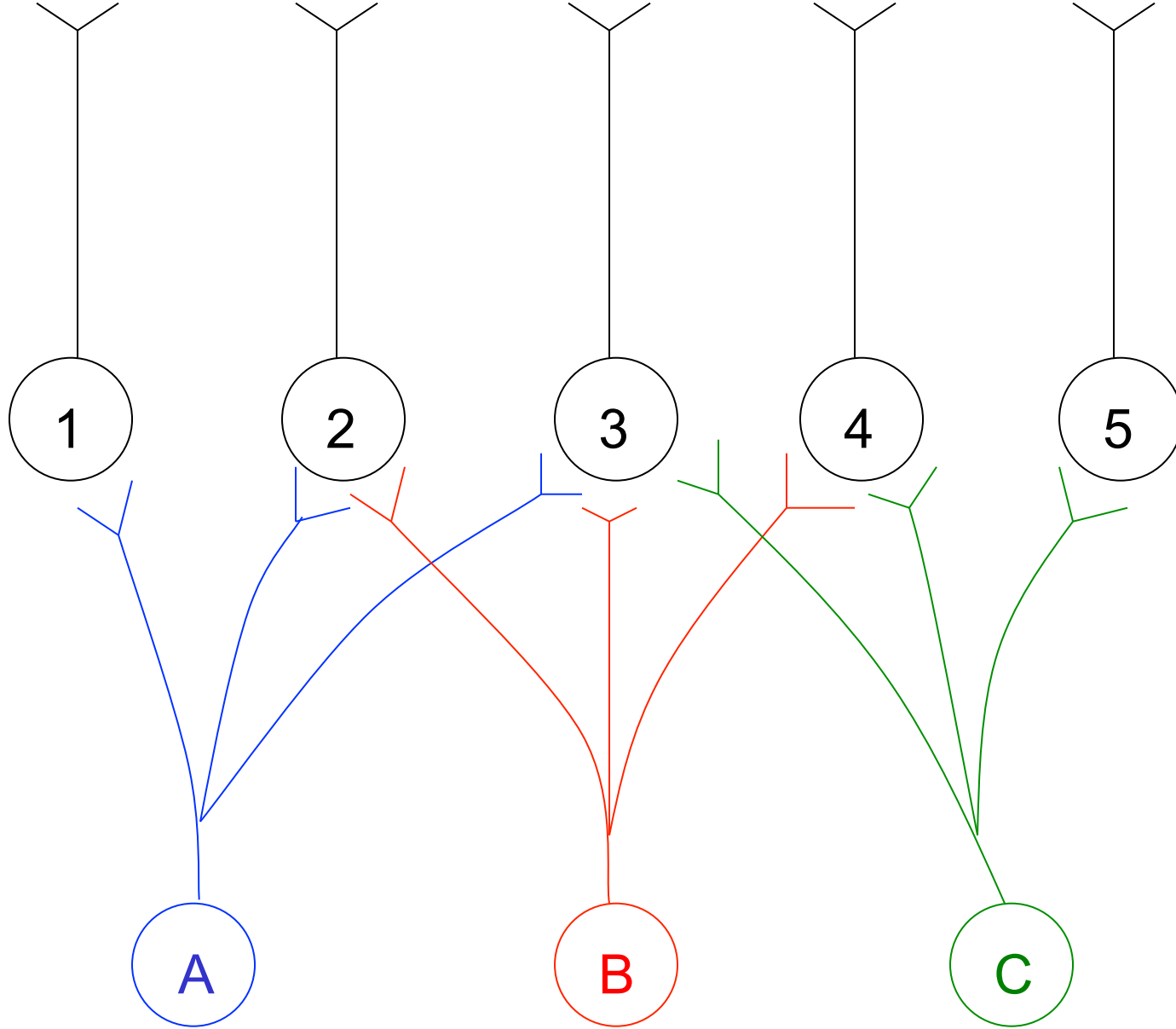


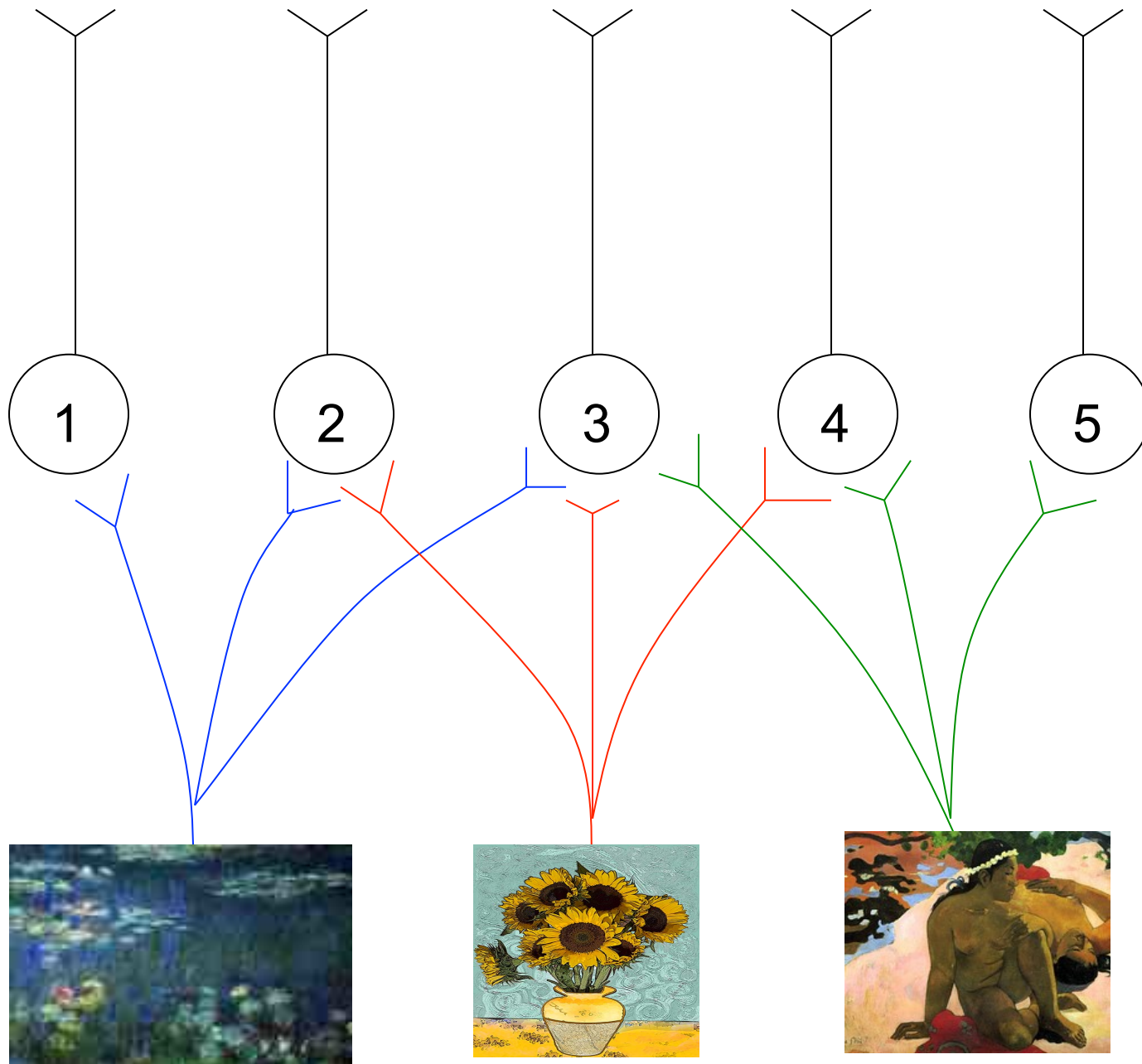


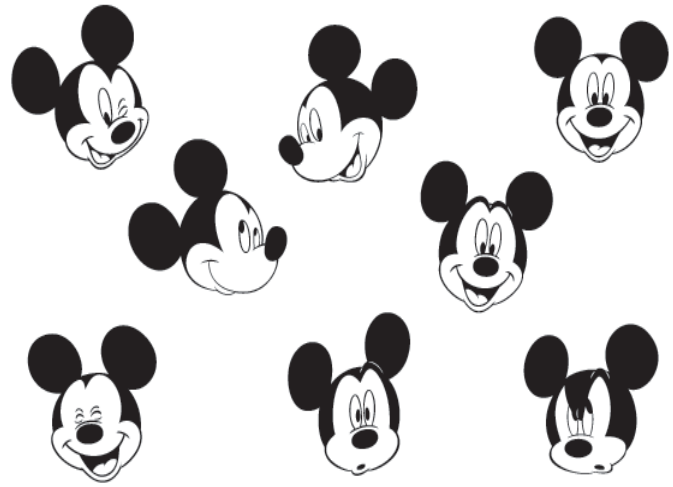


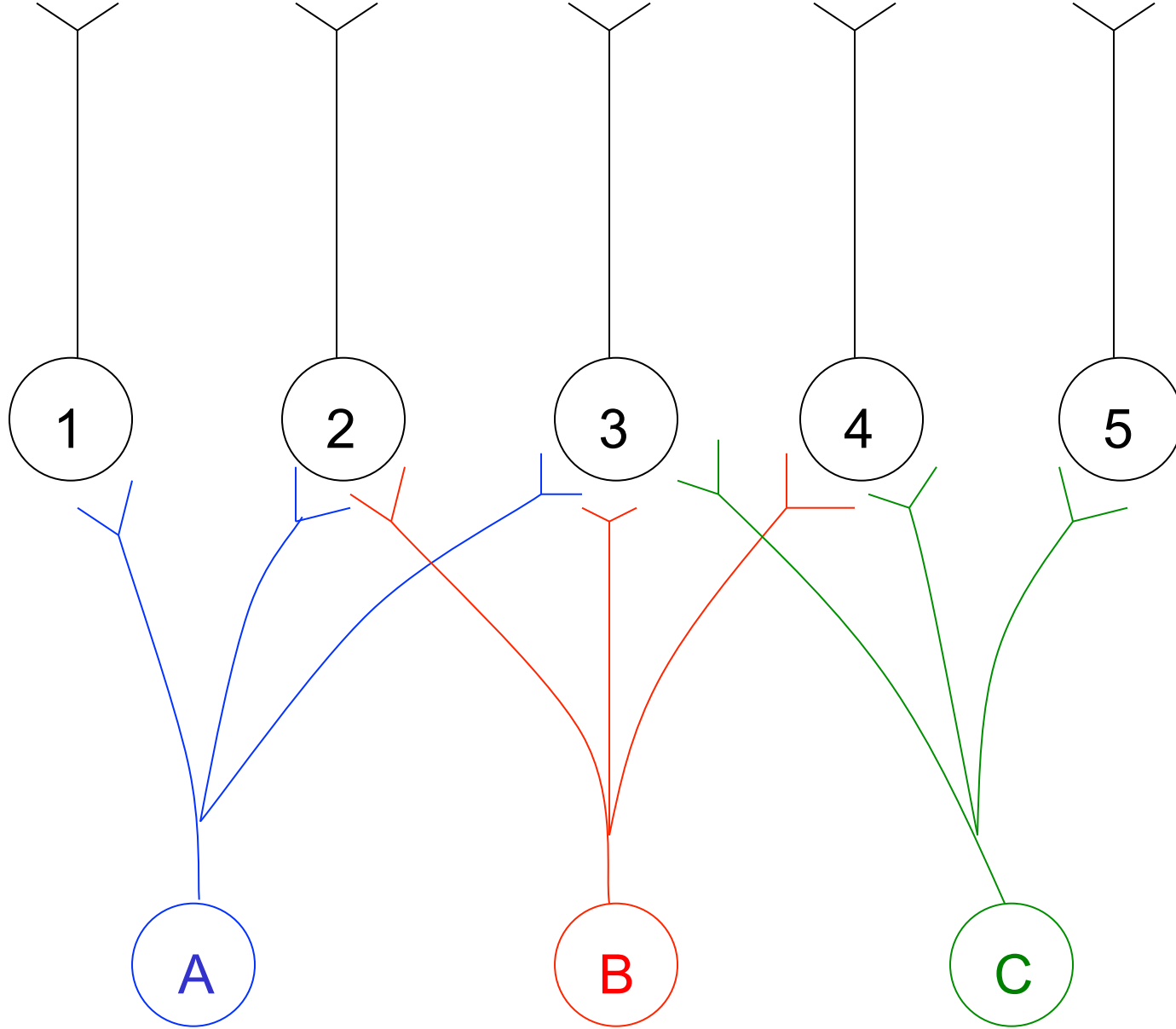
Brainbow

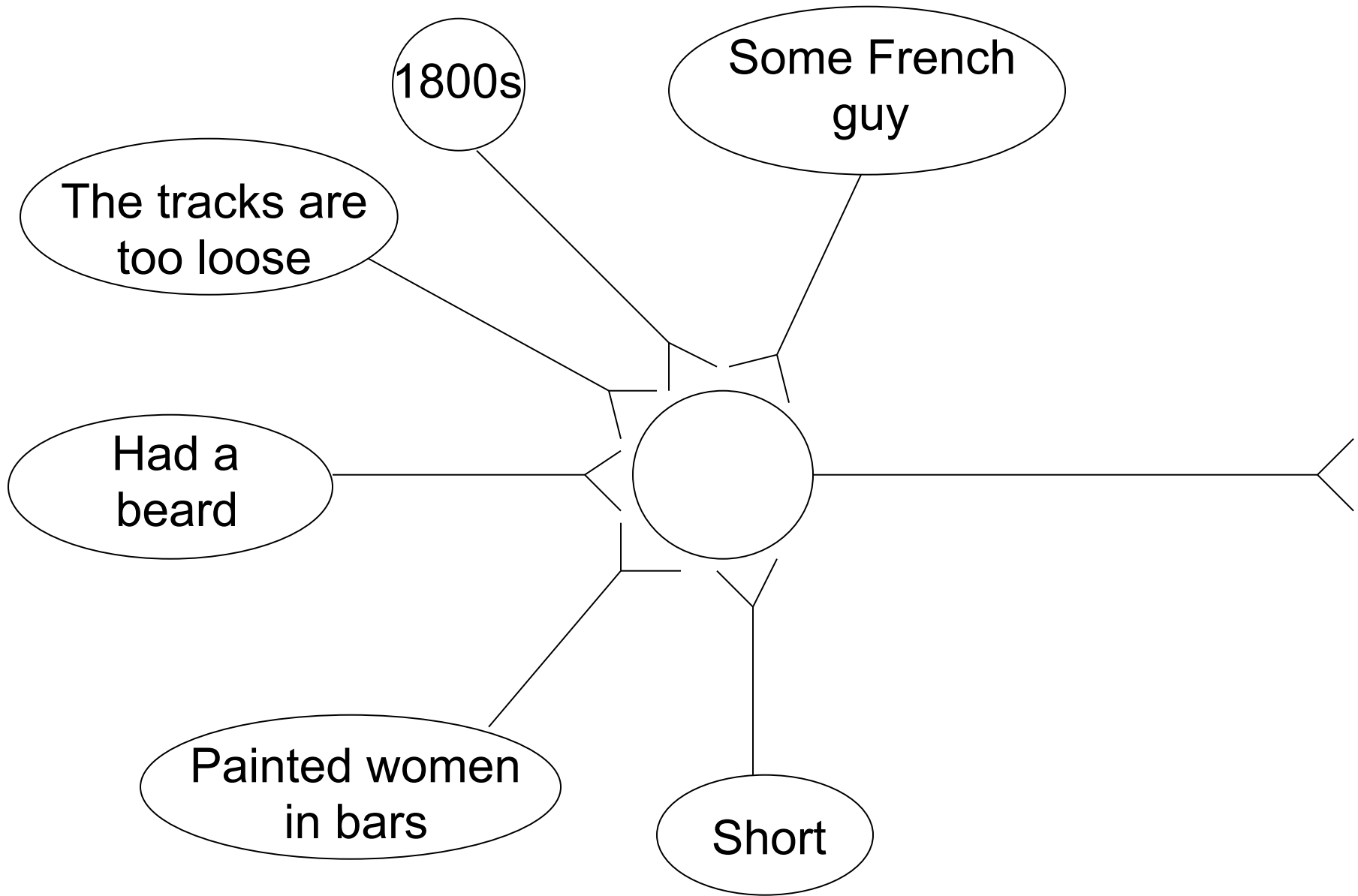


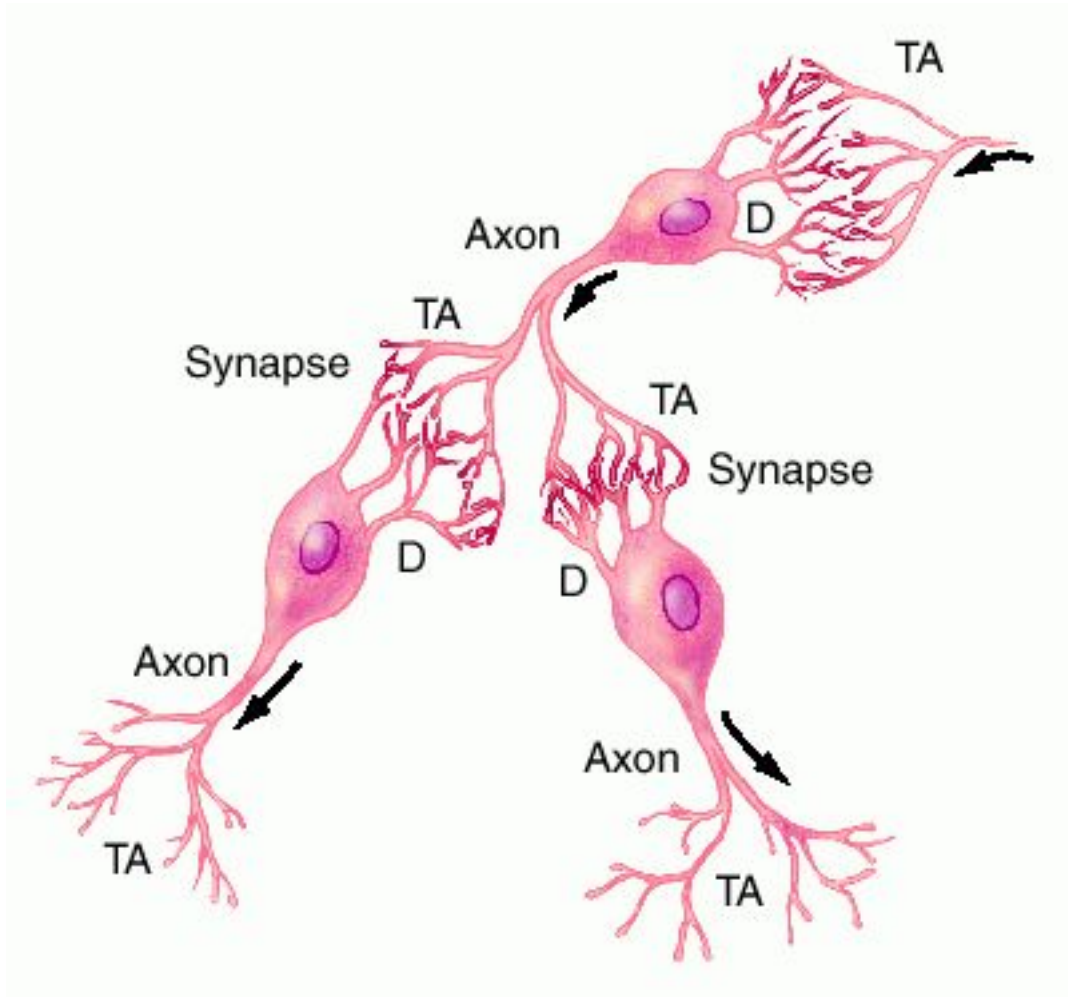


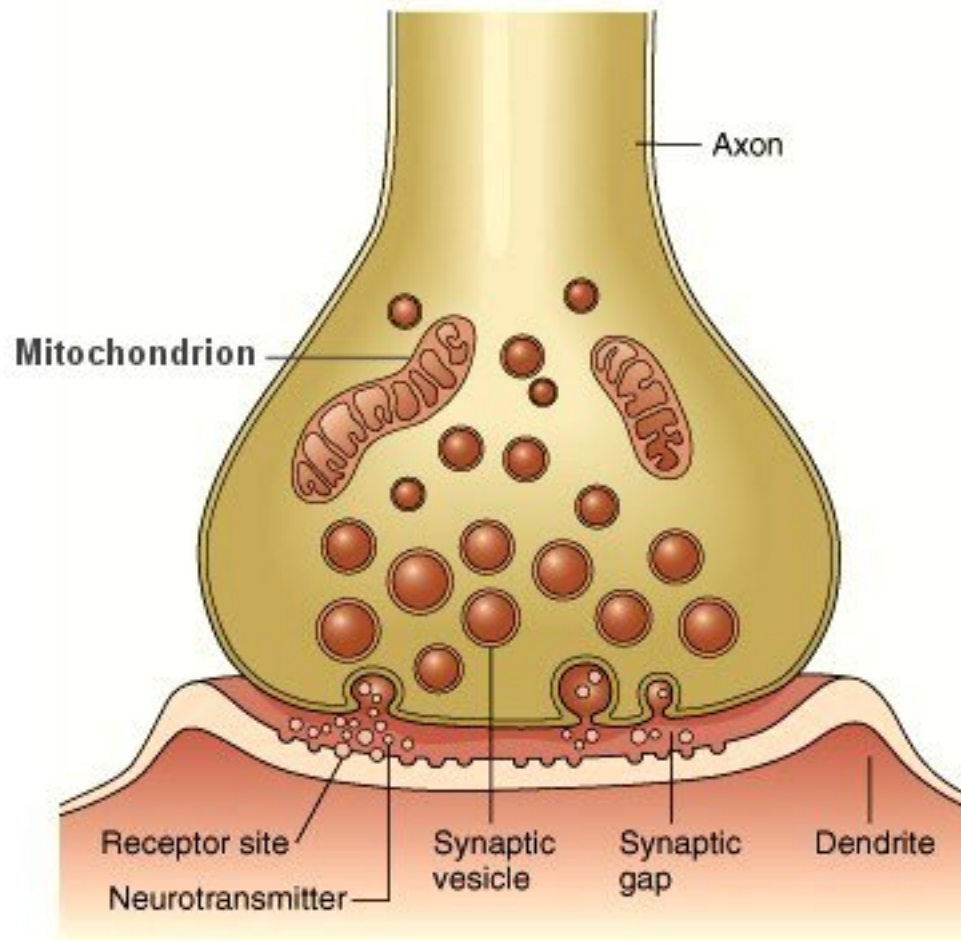


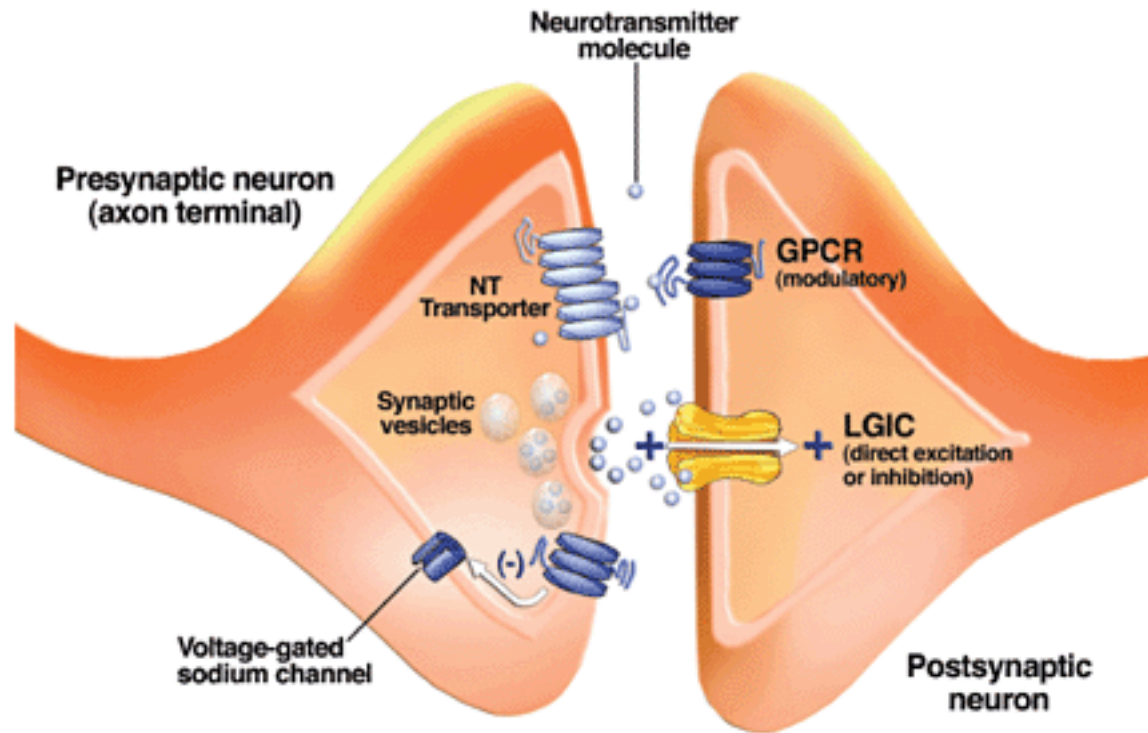












Long-term potentiation (LTP): when a synapse becomes permanently more excitable thanks to repeated use

Some modulators

--Energy availability

--Alcohol

--Estrogen

--Glucocorticoids & stress

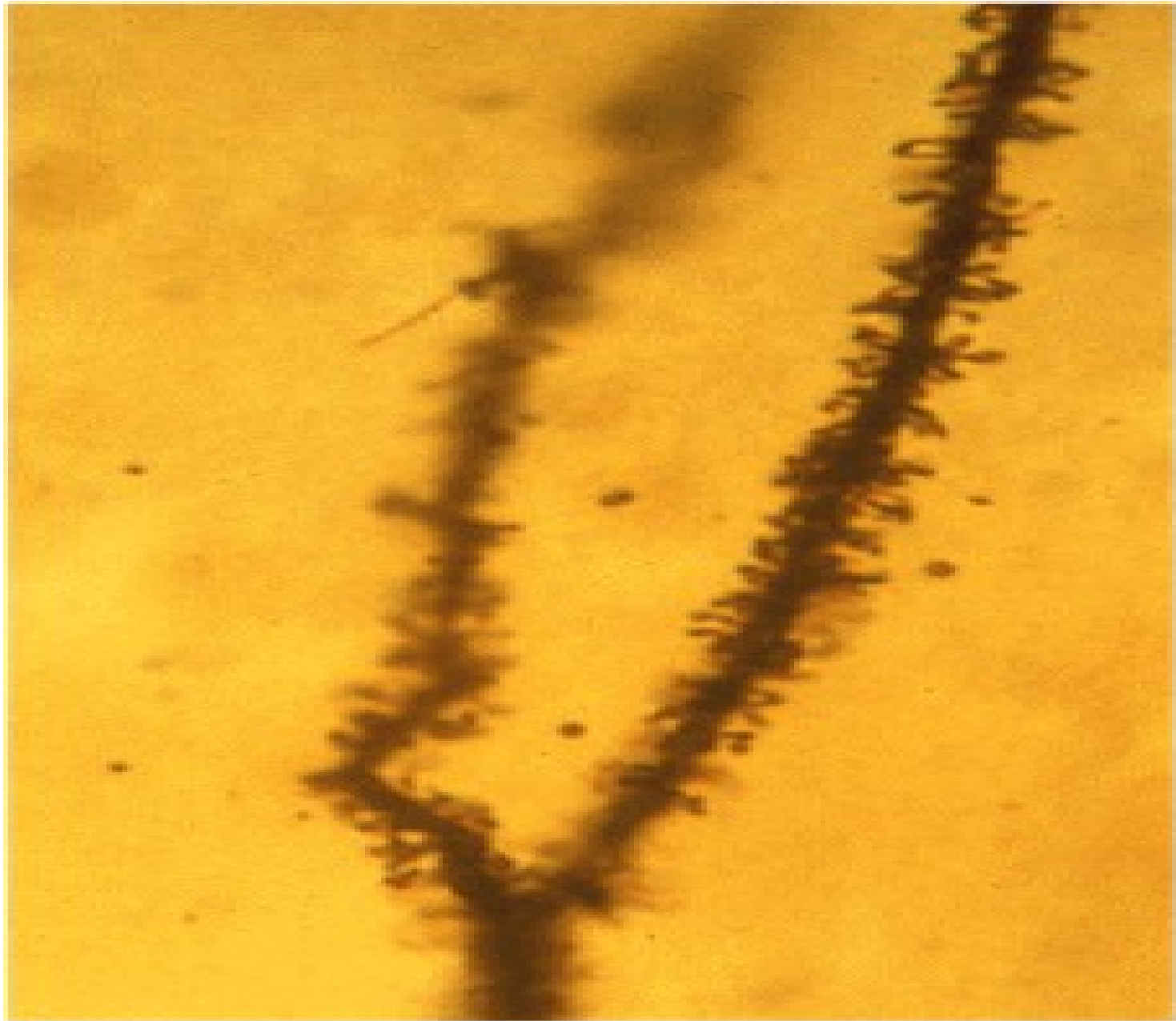
Other realms of long-term potentiation

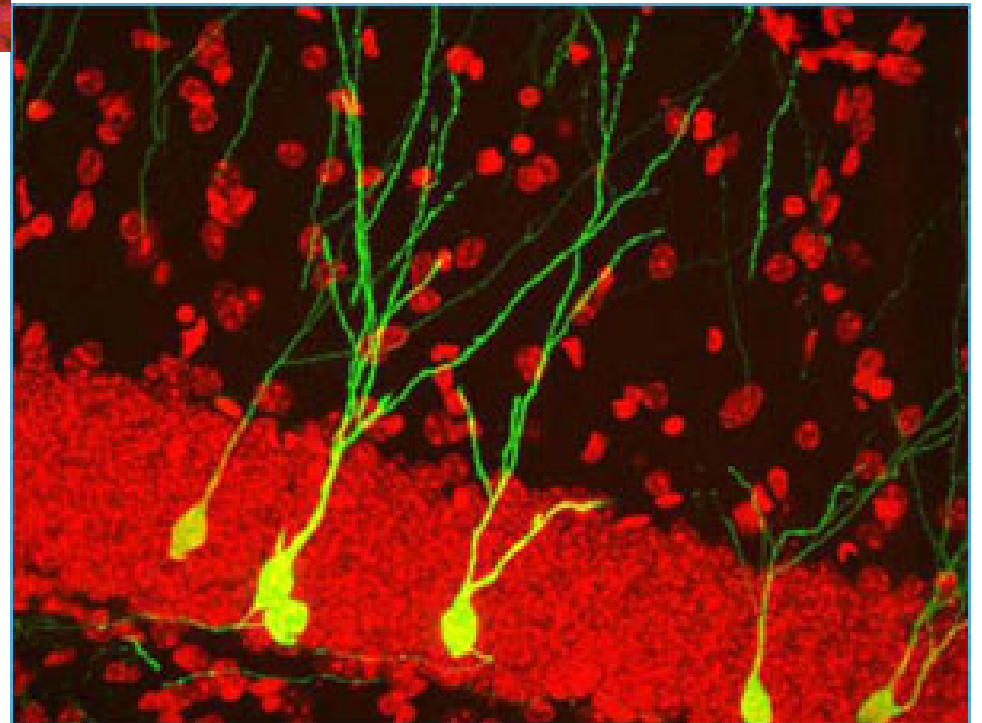
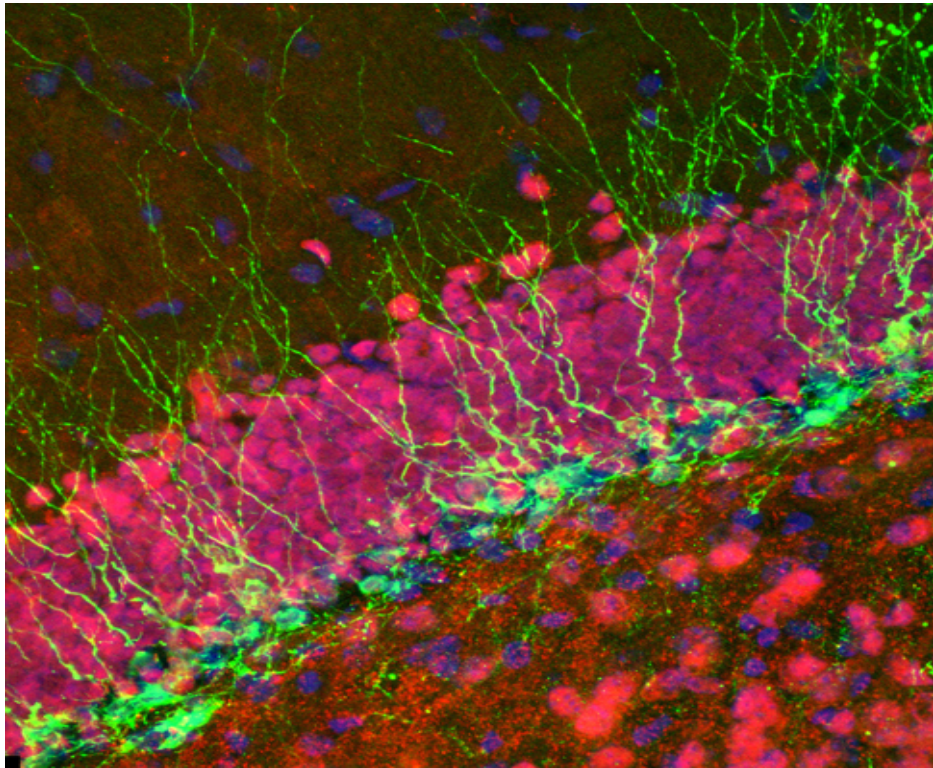
Amygdala: learning to be afraid

Spine: neuropathic pain

Ventral tegmentum: drug cravings

Frontal cortex: peeing at the right time





Adult neurogenesis

Stimulators:

Enrichment, learning, exercise, estrogen

Inhibitors:

Stress, glucocorticoids, inflammation, alcohol